

CLAIMS

1. A method of joining at least two pieces of waterproof laminate by forming a welded seam (80), said method comprising:
 - a) providing at least two waterproof laminates (1a, 1b), each of said laminates comprising at least a waterproof functional layer (50) laminated to a textile layer (30), said textile layer (30) comprising at least a first component and a second component, the first component being stable to a first temperature and the second component melting at a second temperature, wherein the first temperature is higher than the second temperature, and each of said laminates having at least one edge (60a, 60b);
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 - b) placing the at least two laminates together so that the textile layers contact one another and at least one of the edges (60a) of one of the laminates (1a) is aligned with at least one of the edges (60b) of at least one other laminate (1b) to form an edge area (65);
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 - c) welding and pressing said edge area (65) together at a temperature within the melting range of the second component and below the first temperature such that the second component melts and forms a seam between the pieces;
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 - d) cutting the seam allowance; and
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 - e) welding and pressing the seam together to reorient the said edges of the at least two laminates in an edge-to-edge butted orientation.
2. Method according to claim 1, wherein step c) and step d) are carried out simultaneously.
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3. Method according to claim 1, wherein the second component is melttable at a temperature in the range of from 160°C to 230°C.
- 30 4. Method according to claim 1, wherein the first component is stable to a temperature of at least 180°C.

5. Method according to claim 1, wherein the difference in temperature between the first temperature and the second temperature is at least 20°C.
6. Method according to claim 1, wherein step c) and e) are carried out at the
5 same temperatures.
7. Method according to claim 1, wherein step c) is carried out at a temperature in the range of from 160°C to 230°C.
- 10 8. Method according to claim 1, wherein step e) is carried out at a temperature of 160°C to 230°C.
9. Method according to claim 1, wherein step c) and step e) are carried out using ultrasonic energy.
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10. Method according to claim 1, wherein step c) and step e) are carried out in an continuous process.
11. Method according to claim 1, wherein the functional layer (50) is made
20 from expanded polytetrafluoroethylene (PTFE).
12. Method according to claim 1, wherein the seam (80) is reinforced by at least one reinforcement.
- 25 13. Method according to claim 12, wherein the reinforcement is selected from the group of materials comprising tapes, threads, textile laminates.
14. Method according to claim 13, wherein the reinforcement is selected
30 from the group of threads comprising at least one component melting at a temperature in the range of from 160°C to 230°C.

15. A welded seam (80) between at least two pieces of waterproof laminate (1a, 1b), said seam is obtainable by the method according to claim 1.
16. An article comprising a plurality of pieces of waterproof laminate and having at least one welded seam (80) between at least two of said pieces produced by the method according to claim 1.
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17. A combination of at least a first laminate (1a) having a first edge (60a) and a second laminate (1b) having a second edge (60b) joined together at a welded seam (80) in an edge area (65),
10 each of said laminates comprising:
 - a first layer (50) comprising a waterproof functional layer and
 - a second textile layer (30) laminated to said first layer (50) and
 - comprising at least a first component and a second component,
15 the first component being stable to a first temperature and the second component melting at a second temperature, wherein the first temperature is higher than the second temperature,

wherein the seam (80) is formed by the melted second component and the non-melted first component of the textile layers of each laminate, and
20 the first edge (60a) is oriented to the second edge (60b) in a substantially edge-to-edge butted orientation.
18. The combination of claim 17, wherein each of the laminates (1a, 1b) has a laminate-thickness and the welded seam (80) has a seam-thickness
25 wherein said seam-thickness is substantially equal to than the laminate-thickness.
19. The combination of claim 17, wherein the welded seam (80) is substantially non-linear.
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20. The combination of claim 17, wherein the welded seam (80) is in the form of at least one curvature to form a three-dimensional combination.

21. The combination of claim 17, wherein the welded seam (80) is reinforced by at least one reinforcement.
- 5 22. The combination of claim 21, wherein the reinforcement is selected from the group of materials comprising tapes, threads, textile laminates.
- 10 23. The combination of claim 22, wherein the reinforcement is selected from the group of threads having at least one component melting at a temperature in the range of from 160°C to 230°C.
24. The combination of claim 17, wherein the second component is meltable at a temperature in the range of from 160°C to 230°C.
- 15 25. The combination of claim 17, wherein the first component is stable to a temperature of at least 180°C.
26. The combination of claim 17, wherein the difference between the first temperature and the second temperature is at least 20°C.
- 20 27. The combination of claim 17, wherein the seam (80) withstands a water entry pressure of at least 0.07 bar.
- 25 28. The combination of claim 17, wherein the seam (80) withstands a water entry pressure of at least 0.13 bar.
29. The combination of claim 17, wherein the seam (80) has a width less than 0.25 cm.
- 30 30. The combination of claim 17, wherein the second textile layer (30) is composed of a plurality of yarns in the form of strands, filaments, threads or fibers.

31. The combination of claim 30, wherein at least one yarn has a bi-component structure comprising the first component and the second component.
- 5 32. The combination of claim 31, wherein the yarn has a sheath-core structure, with the second component forming the cover.
33. The combination of claim 31, wherein the yarn has a "side-by-side" structure.
- 10 34. The combination of claim 17, wherein the second layer (30) is a knitted, woven or non-woven textile layer.
35. The combination of claim 17, wherein the first component is selected from the group of polymers comprising polyester, polyamide, cellulose or protein fibers.
- 15 36. The combination of claim 17, wherein the first component is polyamide 6.6.
- 20 37. The combination of claim 17, wherein the second component is a thermoplastic.
38. The combination of claim 17, wherein the second component is selected from the group of thermoplastics comprising co-polyester, polyamide, co-polyamide and polyolefin.
- 25 39. The combination of claim 17, wherein the second component is a polypropylene.
- 30 40. The combination of claim 17, wherein the second component is a polyamide 6.
41. The combination of claim 17, wherein the second component is melted using ultrasonic energy.

42. The combination of claim 17, wherein the seam (80) is formed continuously.
- 5 43. The combination of claim 17, wherein the functional layer (50) is a membrane or a film.
- 10 44. The combination of claim 17, wherein the functional layer (50) is selected from the group of materials consisting of polyesters, polyamides, polyolefins, polyvinylchloride, polyketones, polysulfones, polycarbonates, fluoropolymers, polyacrylates, polyurethanes, co-polyetheresters, and co-polyetheramides.
- 15 45. The combination of claim 17, wherein the functional layer (50) is made from expanded polytetrafluoroethylene (PTFE).
46. Articles of clothing made from the combination of claim 17.